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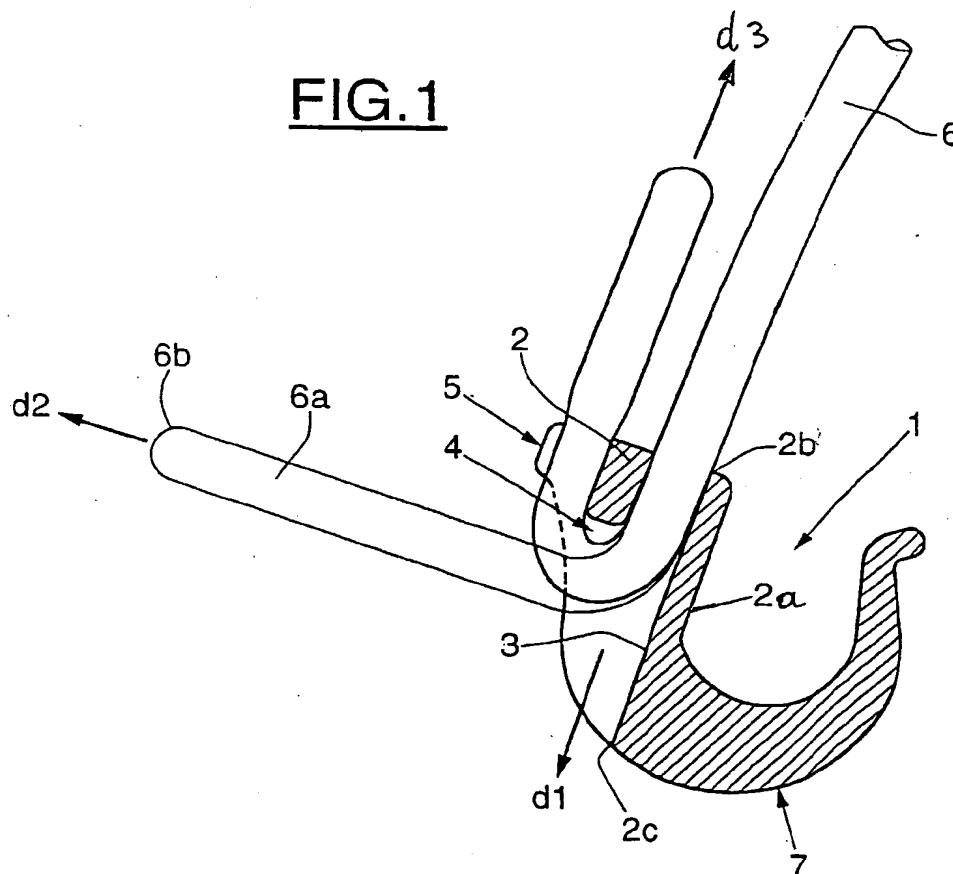
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**(54) Rope lock device and luggage tie**

(57) A rope lock device (1) for fastening a rope (6) comprising a central bore (3) adapted to slidably receive the rope in a first direction (d1) and clamping means (4) comprising a groove portion (8) of decreasing width for

clamping the rope bent in a second direction (d2). The rope lock device (1) further comprises fixing means (5) for releasably fixing the rope in a further bent third direction (d3).

**FIG.1**



## Description

[0001] The present invention relates to a rope lock device for locking a rope at a desired position and to a luggage tie or belt comprising the rope lock device for fixing a piece of luggage to a luggage carrier. The rope lock device and the luggage tie find use, for example as bicycle accessories for fixing luggage to the luggage carrier of a bicycle.

[0002] Many types of rope lock devices are in use today throughout the recreational and commercial industries. Many of the prior art rope lock devices achieve a pinching of the rope creating an opposite force to a direction of pull of the rope.

[0003] A first type of rope lock devices requires the assembling of various parts that together act through mutual movement to achieve the desired pinching of the rope. Locking a rope to such devices often requires a user to use both hands, viz. one hand to approach the rope to the rope lock device that is held in the other hand, and the other hand to hold the rope lock device, to manipulate with the fingers of said other hand the mutually movable parts of the device to achieve the pinching.

[0004] A second type of rope lock devices is comprised solely of a single unit piece having no moving parts. For example, the rope lock disclosed in US 5,671,509 comprises a one-piece unit having a central bore and a groove portion that co-operate with each other to frictionally engage and secure a rope in a desired position. The groove portion is provided in the substantially cylindrical wall of the central bore and has a width that monotonously decreases when going from an open end of the groove to a closed end of the groove for clamping the rope end.

[0005] This prior art rope lock has the following disadvantages. A perpendicularly extending excess end portion of the rope does not look neatly. A long extending excess end portion might accidentally form a loop, which gives rise to the danger that objects may entangle in the loop without intention. When an object that is entangled in an extending excess end moves, or when the excess end is unintentionally drawn in the axial direction, the pinched portion of the rope might be moved in the groove in the direction of increasing width so that the rope is eventually released. Furthermore, when a strong pull is applied to the fixed rope, the edges of the groove exert a locally very strong pressure on the outer surface of the rope, which might eventually lead to localised damage of the outer surface of the rope.

[0006] The present invention overcomes the shortcomings mentioned above.

[0007] It is an objective of the present invention to provide a rope lock that is capable of securely and reliably locking a rope. It is a further objective that the drawbacks of the extending excess end of the rope are cancelled, in particular the danger of unintentionally forming of a loop. It is a still further objective to reduce or avoid the risk that a locked rope is unintentionally released from

the rope lock. It is a still further objective to provide ease and comfort of use by allowing manipulation of the excess end of the rope with only one hand of a user, in a single simple movement.

[0008] A rope lock device for fastening a rope according to the present invention comprises a central bore adapted to slidably receive the rope in a first direction and clamping means comprising a groove portion of decreasing width for clamping the rope bent in a second direction. The rope lock device further comprises fixing means for releasably fixing the rope in a further bent third direction.

[0009] The third direction may lie in a plane that is substantially parallel to the plane spanned by the first direction and the second direction, for example in the same plane. Preferably, the third direction makes an angle of more than 90° with the first direction, preferably approximately 180°.

[0010] Advantageously, the rope lock device further comprises attachment means for connecting the device to an object. The attachment means may be a hook.

[0011] Preferably, the groove portion of the clamping means is in communication with the central bore. The groove portion may have a width that decreases from near an open end to near a closed or bottom end to frictionally engage the rope.

[0012] The fixing means may comprise an open passage adapted to receive the rope bent in the third direction, and the open passage may at least partly be delimited by two lateral wings separated by a gap having a width that is smaller than the diameter of the rope.

[0013] Preferably, the diameter of the open passage is smaller than the diameter of the rope, in particular for co-operating with an elastic rope.

[0014] Preferably, said lateral wings are resilient to facilitate introduction of the rope in said passage.

[0015] Advantageously, the rope lock device is integrally made in one piece, preferably moulded from a synthetic material.

[0016] The invention also relates to a luggage tie for fixing a piece of luggage to a luggage carrier comprising a rope and at least one rope lock device according to the invention, the rope lock device being fixed near an end of said rope.

[0017] The luggage tie may further comprise at least one rope and a stopper fixedly connected at the end of the rope.

[0018] In a preferred embodiment, the luggage tie may comprise clipping means that are adapted to be releasably clipped on another part of said rope.

[0019] Preferably, the clipping means may comprise in such a case, two clip wings and a blind bore adapted to receive and secure the rope end. Said two clip wings are adapted to embrace another part of the rope in such a way that the rope is fixedly and releasably pinched.

[0020] Alternatively, the clipping means may comprise a clip arm and a blind bore adapted to receive and secure the rope end, said clip arm being adapted for em-

bracing another part of the rope in such a way that the rope is fixedly and releasably pinched.

**[0021]** The luggage tie may also comprise at least two similar ropes connected to each other.

**[0022]** Preferably, the rope is an elastic rope. The diameter of the rope decreases as the rope is pulled to lengthen against an elastic force exerted by the rope.

**[0023]** The invention will be better understood and further advantages will become apparent upon studying the detailed description of some embodiments of the invention taken as non-limiting examples with reference to the enclosed Figures, in which:

Figure 1 is a sectional view of an embodiment of the rope lock device according to the invention, showing the bending of the rope from a first to the second and third direction;

Figure 2 is a perspective view on the embodiment of the rope lock device shown in Figure 1, when viewing the device from the lefthand side in Figure 1;

Figure 3 is a side view of an embodiment of an end stop;

Figure 4 is a sectional view of a first embodiment of the end stop of Figure 3 in the sectional plane IV-IV of Figure 3;

Figure 5 is a sectional view similar to Figure 4 of a second embodiment of the end stop of Figure 3; and Figure 6 is a schematic perspective view of an embodiment of a luggage tie comprising a rope lock device according to the invention.

**[0024]** As is best shown on Figures 1 and 2, a rope lock device 1 comprises a main body 2 having a central bore 3 with clamping means 4 for clamping a rope 6 to the rope lock device 1. A fixing means 5, which is adapted to securely fix a free excess end 6a of the rope 6, is integral with the main body 2. Further connected to the main body 2 is an attachment means 7, which is adapted to attach the rope lock device 1 to an object. In the embodiment shown, the attachment means 7 is a C-shaped hook, which is integrally connected to a first side 2a of the main body 2.

**[0025]** The central bore 3 extends through the main body 2 in a first direction d1. The central bore is adapted to slidably receive the rope 6. The central bore 3 has a substantially cylindrical inner wall. The inner diameter of the central bore 3 is generally larger than a diameter of the rope 6. In the embodiment shown in Figure 1, the diameter of the central bore 3 increases slightly from a first diameter near the upper end 2b to a second diameter near the lower end 2c of the main body 2.

**[0026]** A user can thus easily insert an end 6b of the rope in the central bore 3 and push the rope through the central bore 3 until the rope 6 has a desired length.

**[0027]** In the embodiment shown in Figure 1, the clamping means 4 provided in the main body 2 comprises an integral groove 8 formed in a portion of the central

cylindrical wall 10 of the bore 3. As is best shown in the Figure 2, the integral groove 8 is bordered by flanges 9 formed by edge portions of the cylindrical wall 10. The groove 8 is elongated in the cylindrical wall 10 substantially parallel to the central bore 3 and extends from an open lower end 11 to a closed upper end 12 of the groove. The groove 8 has a monotonously varying width, which decreases from a first width near the lower end 11 of the groove 8 to a second width near the bottom end 12. The groove 8 is in communication with an opening of the central bore 3 at the lower end 2c of the main body 2. In other words, the groove 8 represents an extension of the opening of the central bore 3 at the lower end 2c of the main body 2.

**[0028]** The fixing means 5 is located on the main body 2 near the upper end 2b. The fixing means may comprise two opposite lateral wings 13 that partially embrace a second bore or open passage 14. A gap 15 is defined between the lateral wings 13. The gap 15 has a width, which is generally substantially smaller than the diameter of the rope 6. In the embodiment shown in Figure 2, the width of the gap 15 decreases slightly from the inner edge 16 to the outer edge 17 of the gap 15. The lateral wings 13, in the example shown, are resilient to facilitate introducing the rope 6 in the open passage 14. In other embodiments, this is not necessary.

**[0029]** The diameter of the open passage or second bore 14 may be constant or may be monotonously varying, for example decreasing, when going in the direction toward the upper end 2b of the main body 2. At least at one location of the open passage 14, preferably near or at the upper end 2b, the diameter of the open passage 14 is smaller than the diameter of the rope 6. Thus when the rope is inserted in the open passage 14, the rope 6 is pinched, preferably near the upper end 2b. As a consequence, the pinched rope 6 is fixed in the fixing means 5, i.e. the rope 6 will not move or slip along, and is securely kept in the axial direction of the second bore 14. The absolute value and the ratio, respectively, of the diameter of the second bore 14 and the diameter of the rope 6 can easily be selected as a function of the diameter and the elasticity and radial compressibility of the rope 6.

**[0030]** In operation, an end portion 6a of the rope 6 is inserted in an axial first direction d1 into the central bore 3 and further pushed or pulled passed the central bore 3 until the rope 6 has reached a desired length. The end portion 6a of the rope 6 is then bent away from the first direction d1 in a second direction d2, which is substantially perpendicular to the first direction d1, as indicated by the phantom representation in Figure 1. In addition to being bent, the end portion 6a of the rope 6 is also pulled by a user in the second direction d2. As a consequence, since the integral groove 8 is in communication with the central bore 3, a portion of the rope 6 is pulled between the flanges 9 of the groove 8. Since the width of the groove 8 decreases, the rope moving in the groove starts to be pinched. The stronger the pull on the

end portion 6a of the rope 6, the further the rope slides in the groove 8 and the stronger the rope is pinched and thus clamped in the groove 8 between the flanges 9. This can also be achieved when the end portion 6a of the rope 6 is pulled under an angle even smaller than 90°.

[0031] The rope is then further bent away from the second direction d2 and simultaneously pulled into a third direction d3, i.e. until the end portion 6a of the rope 6 is in the direction d3, which is substantially parallel and opposite to the first direction d1, as illustrated on Figure 1. When bending the end portion 6a of the rope into the third direction d3, the user aims to introduce the end portion of the rope in the gap 15 between the lateral wings 13 of the fixing means 5.

[0032] If the lateral wings 13 are resilient, they slightly open so that the width of the gap 15 increases until the rope 6 passes the lateral wings 13 and is received in the open passage 14. The resilient lateral wings 13 then embrace the rope and, since the diameter of the rope is greater than the diameter of the open passage 14, the rope is pinched by the resilient lateral wings 13.

[0033] Alternatively, the rope may be an elastic rope, such that when the elastic rope is pulled in a longitudinal direction, the elastic rope elongates against an elastic force exerted by the rope and at the same time the diameter of the elastic rope decreases. The longitudinal pull on the elastic rope may be increased to an extent that the diameter of the elastic rope decreases below the width of the gap 15. Then, the elastic rope may be inserted in the open passage 14.

[0034] The fixing of the rope in the fixing means may also result from a combination of pinching by resilient wings and pinching of an elastic rope, depending on the type of rope, the particular structural design of the resilient wings and the open passage.

[0035] While the clamping means 4 has been described to have a substantially smooth central bore 3 co-operating with the groove 8, it must be understood that other types of clamping means could be used, for example comprising a passage of diminishing width provided with a plurality of substantially parallel ribs tilted with respect to the axial direction, capable of pinching the rope.

[0036] The rope lock device according to the invention may be used as an element of a luggage tie 20 as shown by way of example in Figure 6. The luggage tie 20 comprises a rope 6 and two rope lock devices 1 as described above each secured to the rope 6 near an end portion 6a of the rope. A rope end stopper 21 is secured to each end portion 6a of the rope. A rope connector 22 is also secured in this example to the rope 6 and adapted to receive a second rope substantially identical to rope 6. To this end the rope connector 22 comprises a bore 23 that receives the rope 6 and may further receive a second rope.

[0037] The rope end stopper 21 serves to releasably connect the end portion 6a of the rope 6 to another part

of said rope 6. As shown in Figures 3 to 5, the rope end stopper 21 may comprise a blind bore 24 that is adapted to receive, and be fixedly connected with, an end of the rope. The tip end 6b of the rope may be secured in the blind bore 24 by any suitable means. The end portion 6a of the rope may also simply be secured to the rope end stopper 21 by pinching within the blind bore 24.

[0038] The rope end stopper 21 further comprises clipping means 25 that are adapted to be releasably clipped to another part of the rope.

[0039] Figure 4 illustrates a first embodiment of a rope end stopper 21, in which the clipping means 25 comprises a resilient clip arm 26 that embraces a portion of a substantially cylindrical clip bore 27 adapted to receive a portion of the rope. A distal end of the clip arm 26 is spaced away from an opposing portion of the outer surface of a substantially cylindrical wall around the blind bore 24 leaving a gap smaller than the diameter of the rope.

[0040] In operation, the rope pressed in said gap resiliently pushes away the clip arm 26 and is finally received in the clip bore 27.

[0041] Figure 5 illustrates a second embodiment of a rope end stopper 21, in which the clipping means 25 comprises two resilient clip wings 28 that embrace a portion of a substantially cylindrical clip bore 27 adapted to receive a portion of the rope. The distal ends of the two clip wings 28 are mutually spaced by a gap smaller than the diameter of the rope.

[0042] In operation, when the rope is pressed in the opening between the distal ends of the clip wings 28, due to the resiliency, the distal end of the clip wings 28 are pushed apart, such that the rope slips passed the distal ends of the clip wings 28 and is received in the clip bore 27.

[0043] In both the embodiments of Figure 4 and Figure 5, the diameter of the clip bore 27 may be greater than the diameter of the rope, in which case the rope is slidably received within the clip bore 27. Alternatively, the diameter of the clip bore 27 may be slightly smaller than the diameter of the rope, in which case the rope is received in the clip bore 27 and pinched therein.

[0044] When the rope lock device 1 is adapted such that the third direction d3 is opposite to the first direction d1 of the rope as shown in Figure 6, the end portion 6a of the rope may be arranged to be substantially parallel to the rope 6, and releasably clipped to another part of the rope.

[0045] When the end of the rope is clipped to another part of the rope using the rope end stopper, the end of the rope is not dangling and the luggage tie used accordingly looks neatly. Further, the risk that the dangling end of the rope unintentionally entangles an object is reduced.

[0046] When the length of the rope end portion 6a is reasonably short, it will be close to the rope along the length of the rope end, so that the forming of a loop, which might unintentionally entangle an object, is re-

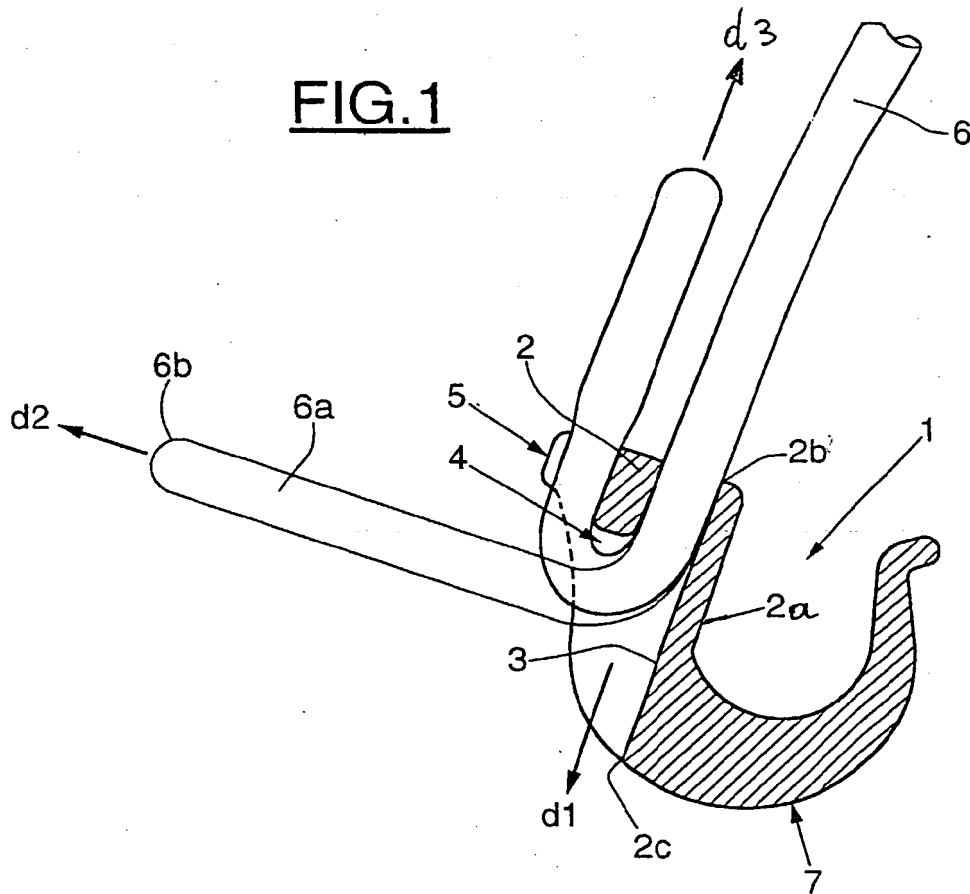
duced or avoided.

[0047] Each of the rope lock device 1, the rope end stop 21 and the rope connector 22 may be made from a synthetic material, preferably in one single piece, for example by a moulding technique. Manufacturing can be simple and manufacturing costs can thus be kept low.

#### Claims

1. A rope lock device (1) for fastening a rope (6) comprising a central bore (3) adapted to slidably receive the rope (6) in a first direction (d1) and clamping means (4) comprising a groove portion (8) of decreasing width for clamping the rope bent in a second direction (d2), **characterized in that** it further comprises fixing means (5) for releasably fixing the rope in a further bent third direction (d3).
2. The device according to claim 1, **characterized in that** the third direction (d3) makes, with the first direction (d1), an angle of more than 90°, preferably approximately 180°.
3. The device according to any one of the preceding claims, **characterized in that** the device further comprises attachment means (7) for connecting the device to an object.
4. The device according to claim 3, **characterized in that** the attachment means (7) is a hook.
5. The device according to any one of the preceding claims, **characterized in that** the groove portion (8) of the clamping means (4) is in communication with the central bore (3) and has width decreasing from near an open end (11) to near a closed (bottom) end (12) to frictionally engage the rope (6).
6. The device according to any one of the preceding claims, **characterized in that** the fixing means (5) comprises an open passage (14) adapted to receive the rope (6) bent in the third direction (d3) at least partly delimited by two lateral wings (13) separated by a gap (15) having a width that is smaller than the diameter of the rope.
7. The device according to claim 6, **characterized in that** said lateral wings (13) are resilient to facilitate introduction of the rope (6) in said passage (14).
8. The device according to any one of the preceding claims, **characterized in that** it is integrally made in one piece, preferably molded in a synthetic material.
9. A luggage tie (20) for fixing a piece of luggage to a luggage carrier comprising a rope (6) and at least one rope lock device (1) according to anyone of the preceding claims, the rope lock device (1) being fixed near an end portion (6a) of said rope.
10. The luggage tie according to claim 9, **characterized in that** it further comprises at least one rope end stopper (21) fixedly connected at the end portion (6a) of the rope (6) and comprising clipping means (25) that are adapted to be releasably clipped on another part of said rope (6).
11. The luggage tie according to claim 10, **characterized in that** the clipping means (25) comprise two clip wings (28) and a blind bore (24) adapted to receive and secure the rope end portion (6a), said two clip wings (28) being adapted to embrace another part of the rope (6) in such a way that the rope is fixedly and releasably pinched.
12. The luggage tie according to claim 10, **characterized in that** the clipping means (25) comprise a clip arm (26) and a blind bore (24) adapted to receive and secure the rope end portion (6a), said clip arm (26) being adapted for embracing another part of the rope (6) in such a way that the rope is fixedly and releasably pinched.
13. The luggage tie according to any one of claim 9 to 12, **characterized in that** it comprises at least two similar ropes connected to each other.
14. The luggage tie according to any one of claim 9 to 13, **characterized in that** said rope (6) is an elastic rope, the diameter of which decreases as the rope is pulled to lengthen against an elastic force exerted by the rope.

**FIG.1**



**FIG.2**

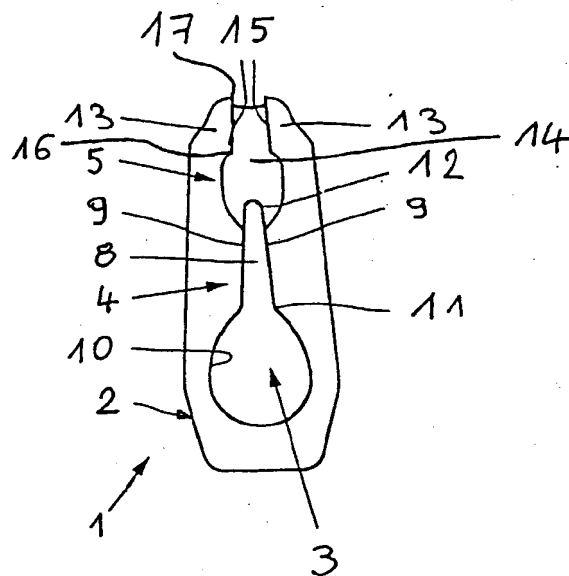


FIG.3

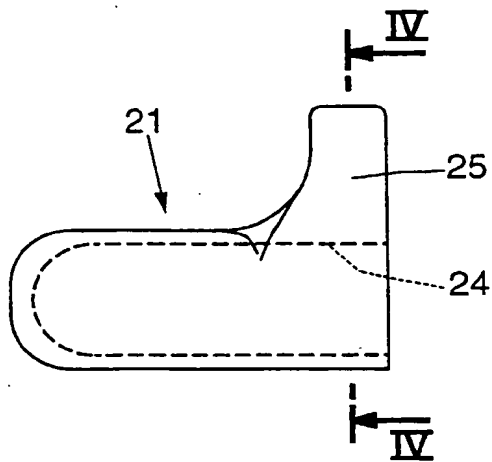


FIG.4

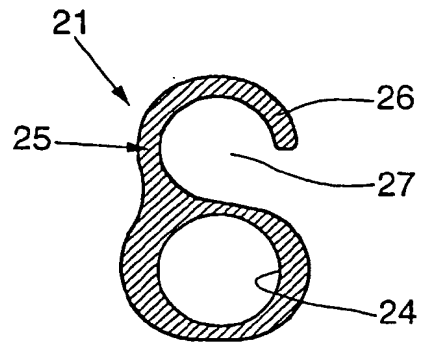
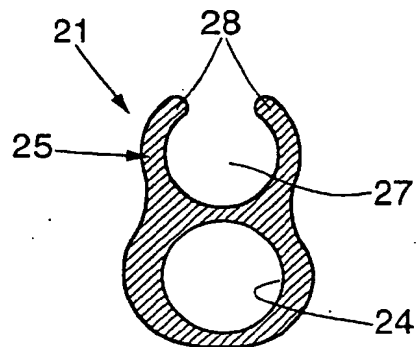
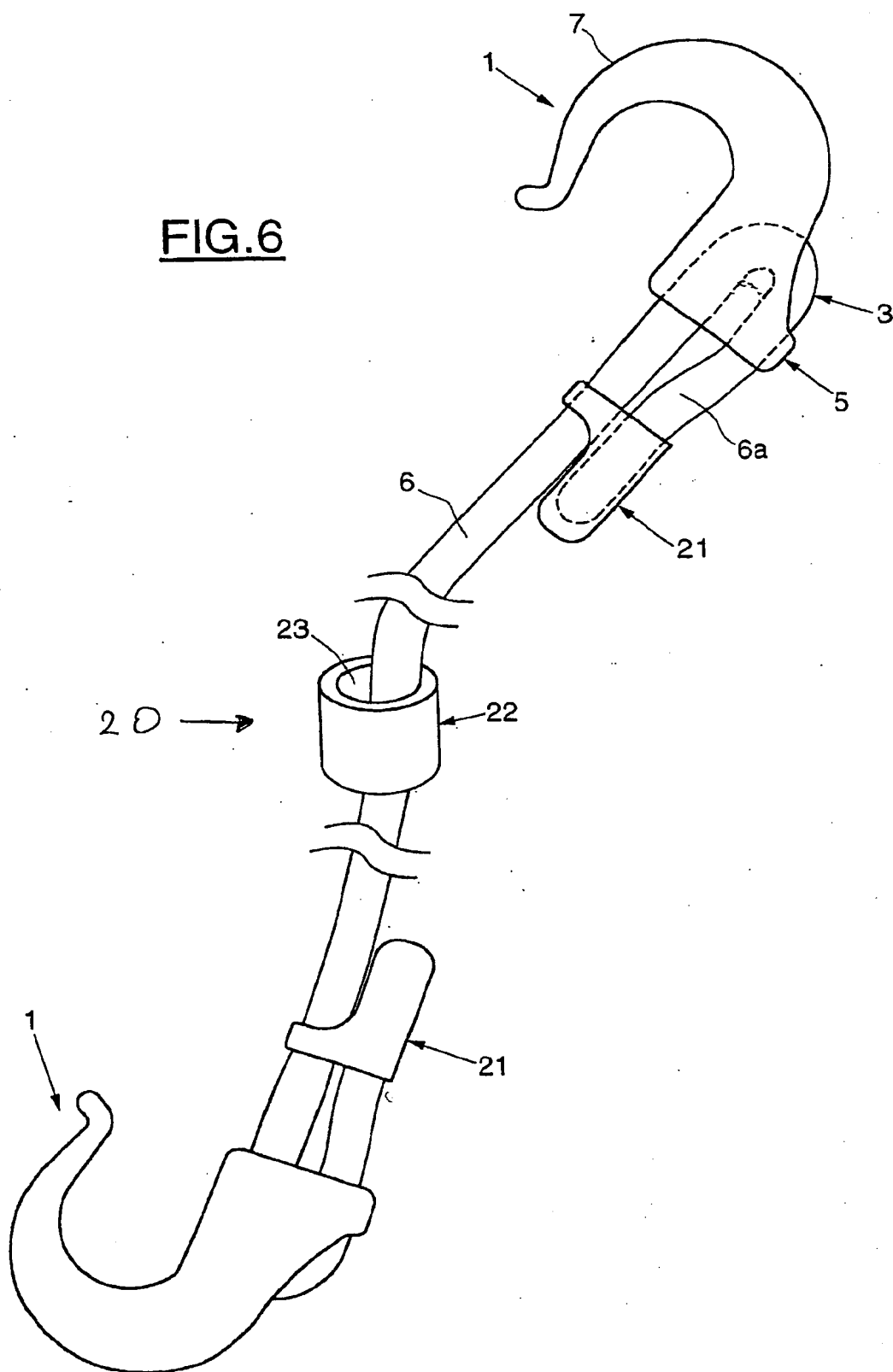


FIG.5



**FIG.6**







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## EUROPEAN SEARCH REPORT

Application Number  
EP 02 29 0133

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 6 012 204 A (ROETHLER MARTY B) 11 January 2000 (2000-01-11) * column 3, line 66 - column 8, line 37 * * column 10, line 24 - line 45; figures 1-16, 29, 30 *	1-9, 14	F16G11/00 B62J7/08
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The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>13 June 2002</b>	Examiner <b>Baron, C</b>
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